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Knowledge of caregivers on the risk factors of otitis media

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ABSTRACT

Introduction: Otitis media (OM) is common in children. In developing countries, it is the most common cause of hearing impairment. Many factors predispose to OM, some of which are modifiable through lifestyle changes. This study aimed to determine the knowledge of caregivers on the risk factors (RFs) associated with OM and their willingness to modify their lifestyle to reduce the risk of OM. The impact of socioeconomic status (SES) on the knowledge and willingness in lifestyle alteration was also assessed. **Materials and Methods:** This is a prospective study using a modified Ear Infection Survey questionnaire. The SES of caregivers/mothers was determined, and they were interviewed to determine their knowledge of RFs for OM and their willingness to undergo lifestyle modifications. **Results:** One hundred caregivers (96 females) were interviewed, majority of whom (81%) were in the higher SES. There were significant differences between low and high SES in day care attendance, siblings and parents with history of OM. Apart from daycare attendance and household smokers, all other RFs were higher among the lower SES. Individuals from low SES background had poorer knowledge of the RFs for OM. A strong willingness to modify behavior to avert a surgical procedure for OM is seen in both groups. **Conclusion:** Caregivers in both SES groups were willing to undergo behavioral modifications in reducing the risk of OM; utilizing this knowledge in educational programs will help to reduce the prevalence of OM in children. This must be coupled with training and encouragement of health workers to disseminate information on RFs of OM.

KEYWORDS: Caregiver, Knowledge, Otitis media, Risk factors, Socioeconomic status

INTRODUCTION

Otitis media (OM) is very common in children worldwide, and in developing countries, it is the main preventable cause of hearing loss, where it accounts for up to 90% of hearing loss in children.^[1] The prevalence of chronic OM varies in different countries and ethnic races, but the greatest burden is exclusive to countries in South East Asia, Western Pacific regions and Africa.^[1] The prevalence of chronic OM in Nigeria is 2-4%, ranking among the highest seen in Sub-Saharan Africa.^[1,2] There are 2.163 million disability-adjusted life years lost to OM,^[3] 94% of which comes from Sub-Saharan Africa.^[1] In the United States, the estimated treatment costs of OM is \$3.8 billion annually,^[4] but scarcity of data in developing countries on health costs burden of OM attempts to mask the severity of the disease. Apart from the costs associated with OM, its association with hearing impairment in developing countries suggests that efforts at curbing the disease should be a priority.

Risk factors (RFs) of OM include recurrent upper respiratory tract infections,^[5,6] tobacco smoke,^[7] bottle feeding,^[8] short duration of breast feeding,^[5] day care attendance,^[6] family history,^[9] male gender and low socioeconomic status (SES).^[10-13] While some of these RFs are inalterable, many of them could be modified by appropriate lifestyle changes.^[13] This presents a huge potential in the control of OM and its associated sequel that can be tapped by such lifestyle changes. This study aimed to determine the knowledge of caregivers on the RFs associated with OM and their willingness to modify their lifestyle to reduce the risk of OM in their children. We also sought to examine the impact of SES on the knowledge level and willingness in lifestyle alteration.

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MATERIALS AND METHODS

Study design

This is a prospective study to assess the knowledge base of caregivers of young children about RFs for OM. This was done using a modified Ear Infection Survey questionnaire.^[13] The caregivers/mothers of young children presenting to the ENT outpatient clinic and the immunization clinic were interviewed to determine their knowledge of RFs for OM using the survey instrument. Apart from assessing the general knowledge of the mothers on OM, the instrument was also designed to determine whether the mothers were aware of the RFs that were unchangeable and those that could be modified. It also aimed to determine their willingness to undergo lifestyle modifications to reduce the risk of OM in their children. The instrument also collected data to determine the socioeconomic class of the respondents.

Methodology

The caregivers/mothers were recruited from both clinics sequentially irrespective of the complaint the child may present with to the hospital. Classification into socioeconomic classes was done using level of educational attainment and occupation as indicators. A previous study in Nigeria has demonstrated that these indicators can be used to delineate socioeconomic classes.^[14] The participants were grouped into five classes, with class 1 being the highest and class 5 being the lowest. Classes 1-3 was grouped as high SES and classes 4-5 as low SES.

Data analysis

Results of the categorical variables were presented in frequency tables, correlations were sought with Chi-square test between the SES and the following: RFs of OM, knowledge of RFs and willingness to modify behavior. Student's *t*-test was used to assess the equality of means and Levene's test for equality of variances.

RESULTS

One hundred caregivers completed the questionnaires; they were principally females (four males), with ages ranging from 17 to 49 years. The study site is in Southwest Nigeria, where the predominant tribe is Yoruba. This is reflected in the tribal distribution of the caregivers surveyed [Table 1]. Majority of the caregivers surveyed were in the higher socioeconomic strata; SES I-III made up a cumulative proportion of 81% [Table 2]. Middle ear ventilation tubes are not popular in Nigeria, and this is reflected in the answers given by the caregivers. None of the children represented has ever had ventilation tubes. There are significant differences among low and high SES in day care attendance, siblings with OM and parents with history of OM. Only children from the high SES attend a day care; household smokers are also higher in the high SES group; apart from these, every other RF is higher among the lower SES [Table 3]. The answers from the respondents suggest that people from the high SES have better knowledge of all the RFs of OM included

in the questionnaire than people from low SES. The difference in knowledge of household smokers and breast feeding as RFs is significantly different between the two groups [Table 4]. A within-group analysis showed that knowledge of the protective effect of breastfeeding is greatest within the high SES group, followed by a parental history of OM and day care attendance. The low SES generally displayed a poor knowledge of RFs associated with OM. None of the respondents in the low SES group makes use of day care services, indicating that there is no behavior modification in that aspect for them. There is no significant difference between the two groups in their willingness to modify behavior to reduce cigarette smoke exposure to children, although it appears that the low SES is strongly averse to surgical procedures [Table 5].

DISCUSSION

Our study population is overwhelming female; this may be attributed to our mode of recruitment from within hospital visitors. In many African countries, mothers and female caregivers are more likely to present with sick children to the hospital. We also recruited from immunization clinics,

Table 1: Ethnic distribution

Tribe	Frequency
Yoruba	66
Hausa	6
Igbo	11
Egbira	1
Urhobo	1
Not indicated	15
Total	100

Table 2: Socioeconomic strata

SES	Frequency
I	48
II	19
III	14
IV	10
V	9
Total	100

SES: Socioeconomic strata

Table 3: Risk factors

Risk factors	High SES	Low SES	P value
Siblings with OM	3	4	0.006
Parents with history with OM	3	5	0.001
Household smokers	7	4	NS
Daycare attendance	17	0	0.026
Discussion of OM risk factors with health care worker	22	4	NS
Episodes of OM in past 12 months			
0	53	1	NS
1-2	10	5	
3-4	3	7	
5-6	1	3	

OM: Otitis media, SES: Socioeconomic strata

Table 4: Knowledge of risk factors

Survey questions	Mean score		
	High SES	Low SES	P value
Cigarette smoke exposure increases OM risk	2.97	3.63	0.019
Breastfeeding decreases risk of OM	2.38	3.31	0.019
Day care attendance increases risk of OM	2.6	3.1	NS
Parental history of OM increases risk of OM	2.49	3.0	NS
Existence of a vaccine which decreases OM	3.18	3.36	NS

OM: Otitis media, SES: Socioeconomic strata

which are likely to be dominated by female caregivers. The tribal pattern seen in our study is a reflection of the location of our study center; although Ibadan is a cosmopolitan city, the southwestern part of the country is mainly populated by the Yoruba tribe. However, the accepted opinion is that cultural differences between the tribes will not significantly impact the quality of answers seen; rather, the SES.

Poverty might be the single largest influence on causation of diseases. It is also directly linked to level of educational attainment; this may have prompted the World Health Organization to promote the education of females since it has been shown that child survival is directly related to educational status of their mothers.^[15,16] Apart from RFs associated with affluence, the low SES unsurprisingly had the greater incidence of RFs of OM. Low SES itself is a RF, and it is closely associated with RFs such as overcrowding. Different studies that have explored the relationship between SES and OM have suggested that there is greater prevalence of OM in low SES.^[17,18] Poverty is a vicious circle, and this may explain the recurrence of OM seen in parents in the offspring as well. Other factors may be responsible for greater incidence of OM in the low SES. This may include exposure to smoke from biomass and other sources, lack of access to adequate healthcare and drugs. Malnutrition, which is common in the low SES, has been associated with impaired immunity;^[19] moreover, impaired immunity may predispose to the development of OM.^[20] This may be one of the mechanisms by which low SES is related with OM.

The poor knowledge of all RFs of OM demonstrated by the low SES group suggests that a public enlightenment campaign targeted at this section of the society is necessary. Since lack of knowledge may constitute a barrier to behavior change,^[21] appropriate educational campaign techniques directed at the low SES community can achieve expected behavioral modification. The better knowledge of OM RFs seen in the high SES group is different from a similar study in India, where it was found that SES has no relationship with knowledge of OM RFs among caregivers.^[22] The differing results from the two studies might be due to the different ways of determining the SES: Whereas education and occupation of both parents was used in this study, the Indian study used only the residential type to classify caregivers into SES groups.^[22]

Table 5: Behavior modification

Survey questions	Mean score		
	High SES	Low SES	P value
Willing to change smoking habit to reduce OM risk in children	1.5	1.83	NS
Willing to change smoking habit to reduce risk of surgery for ear tubes	2.0	1.0	NS
Willing to change child day care arrangement to reduce risk of OM	1.75		
Willing to change child day care arrangement to reduce risk of surgery for ear tubes	2.0		

OM: Otitis media, SES: Socioeconomic strata

Cigarette smoking appears to be related to affluence in this dataset. This however may not be truly reflective of the larger society. Attendance in day care usually means additional expenditure for the household, which may explain why none of the children of the participants in the low SES group attends day care. The overcrowding usually seen in day care and high prevalence of upper respiratory tract infections among children in day care may contribute to OM. The high SES group is better educated and is more likely to make inquiry from health personnel about the nature of diseases and preventive measures. Nonetheless, only 26% of the caregivers surveyed reported that they have been educated by health personnel on the risks of ear infection. It has been recommended that parents be counseled by health workers on the choice of day care arrangements.^[23] Additional suggestions to emphasize the benefits of small day care settings in reducing the risk of OM over a large day care during counseling have been made, especially in the presence of RFs, such as exposure to second hand cigarette smoke or the presence of OM in a sibling.^[24] This counseling should be disseminated at all levels of healthcare access points to ensure that both low SES and high SES individuals benefit from the advice.

Attending day care has been linked to a maximum of five-fold increase in the risk of developing OM, while exposure to cigarette smoke can cause up to two-fold increased risk.^[25] Even though the high SES group are aware of the risks of day care attendance and of cigarette smoke exposure, the incidence of these two risks is highest in the same group. However, their willingness to modify behavior suggests that educational campaign should not stop at disseminating information, but also challenge the recipient on appropriate behavior modifications. Physicians counsel are usually held in high esteem by patients and patient relations, but it is not all doctors that are comfortable in challenging their patients on necessary behavioral change. A study among pediatricians in the United States showed that less than half of all doctors surveyed were comfortable or confident in advising parents to stop smoking.^[26] The desired change may be more easily achieved by offering additional training and encouragement to health workers to disseminate relevant medical information and challenge their patients to modify behavior accordingly.^[24,26]

Several independent authors have identified exposure to wood smoke as a RF in OM.^[2,12,27] More children from the low SES group may be predisposed to indoor wood smoke; however, adoption of newer wood stoves that has considerable less emission of pollutants^[28,29] than traditional open stoves may mitigate the risk associated with wood smoke. There is currently no available data on the impact of these new stoves on the risk of developing OM, but it is necessary to evaluate the impact of these stoves on middle ear infection, especially in developing nations.

Myringotomy tube insertion is not commonly done in Nigeria; this may be due to the structure of the healthcare system in the country, where other allied health workers are usually the first point of contact for health care seekers. Before patients are seen by the specialist, most cases of OM are already chronic, with large perforations in the TM obliterating the need for grommet insertion; however, other forms of surgical treatment for chronic ear disease are routinely done. The affirmative willingness of caregivers, especially those from the low SES groups, to modify behavior in order to avoid surgery indicate issues that should be emphasized in the design of lifestyle modification educational programs for caregivers. Since the questions on lifestyle modification were directed only at caregivers whose children were exposed to risk, it clearly demonstrates the potential that can be exploited in behavioral modification.

The limitation of the study is the site of recruitment of participants; being clinics in a referral hospital setting, it is likely that the majority of clients will be educated city dwellers and fall into the high-income group. Conducting the study in primary care centers located in rural areas may attract more low-income participants.

CONCLUSION

Knowledge of modifiable RFs of OM increases with the SES of the caregiver; this supports the argument that improvement of the economic base of households impacts significantly on the health outcomes of individuals in the households. Therefore, healthcare programs in developing countries must be tied to economic empowerment programs to achieve the desired outcomes. Additional training and encouragement of health care workers at all levels is required to disseminate information to caregivers on RFs of OM. Utilizing the knowledge that caregivers are willing to undergo behavioral modifications in educational programs will be beneficial in reducing the prevalence of OM in young children.

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